

JUL 03 2007

Application No.: 10/623,011

Docket No.: NGW-009RCE

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An apparatus for protecting a fuel cell which generates electricity by supplying as reaction gases hydrogen to an anode and oxygen to a cathode for electrochemical reaction, the apparatus comprising:

a hydrogen sensor for detecting hydrogen in off-gas discharged from the cathode;  
an operating state detecting unit separate and distinct from the hydrogen sensor for detecting an operating state of the fuel cell;

a memory unit for storing a determination threshold value which is dynamically set changes according to the operating state of the fuel cell during operation of the fuel cell, wherein the determination threshold value decreases when a loaded state of the fuel cell decreases;

an abnormal state determining unit for comparing a detection value outputted from the hydrogen sensor and the determination threshold value obtained from the memory unit according to the operating state of the fuel cell outputted from the operating state detecting unit and determining that the fuel cell is in an abnormal state if the detection value exceeds the determination threshold value; and

a protecting unit for changing the operating state of the fuel cell if the abnormal state determining unit determines that the fuel cell is in the abnormal state.

2. (Original) An apparatus for protecting a fuel cell as set forth in Claim 1, wherein the protecting unit reduces at least one of the difference in pressure between the reaction gases at the anode and the cathode, supply pressure of the reaction gases, supply flow rate of the reaction gases and generated current of the fuel cell.

3. (Original) An apparatus for protecting a fuel cell as set forth in Claim 1, wherein the operating state detecting unit includes at least one of a pressure detector for detecting the pressure of the reaction gases supplied to the anode and the cathode, a flow rate detector for detecting the flow rate of the reaction gases supplied to the anode and the cathode, a current controller for detecting generated current of the fuel cell.

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4. (Currently Amended) A method for protecting a fuel cell which generates electricity by supplying as reaction gases hydrogen to an anode and oxygen to a cathode for electrochemical reaction, the method comprising:

detecting hydrogen in off-gas discharged from the cathode;

detecting an operating state of the fuel cell, separately and distinct from detecting the hydrogen in the off-gas discharged from the cathode;

comparing a detection value of the hydrogen in the off-gas and a determination threshold value set dynamically changing according to the detected operating state of the fuel cell during operation of the fuel cell, wherein the determination threshold value decreases when a loaded state of the fuel cell decreases;

determining that the fuel cell is in an abnormal state if the detection value exceeds the determination threshold value; and

changing the operating state of the fuel cell if the fuel cell is determined to be in the abnormal state.

5. (Original) A method for protecting a fuel cell as set forth in Claim 4, wherein the operating state changing step includes reducing at least one of the difference in pressure between the reaction gases at the anode and the cathode, supply pressure of the reaction gases, supply flow rate of the reaction gases and generated current of the fuel cell.

6. (Original) A method for protecting a fuel cell as set forth in Claim 4, wherein the operating state detecting step includes detecting at least one of the pressure of the reaction gases supplied to the anode and the cathode, the flow rate of the reaction gases supplied to the anode and the cathode, and generated current of the fuel cell.

7. (Previously Presented) An apparatus for protecting a fuel cell as set forth in Claim 1, wherein the operating state of the fuel cell includes a differential pressure between the reaction gases at the anode and the cathode, a supply pressure of at least one of the reaction gasses, a supply flow rate of at least one of the reaction gases, or a generated current of the fuel cell.

8. (Previously Presented) A method for protecting a fuel cell as set forth in Claim 4, wherein the operating state of the fuel cell includes a differential pressure between the reaction

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gases at the anode and the cathode, a supply pressure of at least one of the reaction gasses, a supply flow rate of at least one of the reaction gases, or a generated current of the fuel cell.